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PLANETARY PHENOMENA FOR SEPTEMBER AND OCTOBER, 1920

By Malcolm McNeill

PHASES OF THE MOON, PACIFIC TIME.

Last Quarter...Sept.	5, 11^h 5^m A.M.	Last Quarter.....Oct.	4, 4^h54^m P.M.
New Moon..... "	12, 4 52 A.M.	New Moon...... "	11, 4 50 P.M.
First Quarter... "	19, 8 55 P.M.	First Quarter..... "	19, 4 29 P.M.
Full Moon..... "	27, 5 57 P.M.	Full Moon........ "	27, 6 9 A.M.

The third eclipse of the year will be *a total* eclipse of the Moon on October 27th, the beginning visible generally in the western part of North America, the Pacific Ocean and eastern Asia, the ending visible generally in the western portion of the Pacific Ocean and the eastern hemisphere nearly to the Atlantic Ocean. The circumstances of the eclipse are as follows, Pacific Time:

Moon enters penumbra	October 27th, 3^h24^m A.M.
Moon enters umbra	October 27th, 4 26 A.M.
Total eclipse begins	October 27th, 5 29 A.M.
Middle of eclipse	October 27th, 6 11 A.M.
Total eclipse ends	October 27th, 6 54 A.M.
Moon leaves umbra	October 27th, 7 57 A.M.
Moon leaves penumbra	October 27th, 8 59 A.M.

The autumnal equinox, the time when the Sun crosses the equator from north to south, occurs September 23d, 12^h29^m A. M. Pacific Time.

Mercury is very close to the Sun on September 1st and passes superior conjunction on September 8th becoming an evening star. It gradually moves out to greatest east elongation reaching this on October 24th. The elongation, 24°8′, is rather greater than the average greatest elongation, but the planet is far south of the Sun and the interval between the setting of the Sun and planet is only about one hour, so the conditions for visibility are not at all good, as is generally the case in greatest east elongations which happen in the autumn. On September 8th *Mercury* is in very close conjunction with *Saturn*, the distance between the planets being only 6′; but unfortunately both planets are within one day of conjunction with the Sun at the time.

Venus is an evening star gradually increasing its distance from the Sun. On September 1st the planet remains above the horizon only a little more than half an hour after sunset. This interval increases to about an hour and one-half by the end of October, so that the planet is becoming a rather conspicuous object in the evening twilight during October, altho not nearly as bright as it will be during the late winter and early spring of 1921.

Mars is still in fair position for observation during the early evening. On September 1st it sets shortly before 10 P. M. and at about half after eight on October 31st. During the two months the planet moves about 46° eastward from *Libra* thru *Scorpio*, and into *Sagittarius*. On September 17th it is in conjunction with *Antares*, *α Scorpii*, the planet passing a little less than 3° north of the star. Both planet and star are of decidedly ruddy color, but the planet is twice as bright as the star. The planet continues to grow less bright losing nearly half its light during the two months, so that at the end of the period it is about as bright as a standard first magnitude star. Its distance from the Earth increases from 113 millions of miles on September 1st to 144 millions on October 31st.

Jupiter passed conjunction with the Sun on August 22nd and became a morning star drawing slowly away from the Sun, but it does not reach a sufficient distance from that body to be easily seen in the morning twilight until well after September 1st. By September 15th it rises about an hour and a half before sunrise. By October 31st it rises shortly before 2 A. M. During the two months it moves about 11° eastward and 4° southward in the constellation *Leo*.

Saturn passes conjunction with the Sun on September 7th and becomes a morning star. By the end of the month it rises rather more than an hour and a half before sunrise so that it is then easily visible in the morning twilight. By the end of October it rises at about half after two in the morning. During September and October it moves about 6° eastward and 3° southward in *Leo*. It is moving in the same general direction as *Jupiter* but at a much smaller rate so that the distance between the bodies diminishes about 5° during the two months.

Uranus passed opposition with the Sun on August 26th and is therefore above the horizon thruout nearly the entire night during early September. By the end of October it sets at about 1:30 A. M. It moves about 2° westward during the two months away from the fifth magnitude star *σ Aquarii* near which it was during August. It will therefore not be as easy to identify.

Neptune is a morning object on the border of the constellations *Cancer* and *Leo*, too faint to be seen without a telescope.